

Application No. 10/753,138

Supplemental Reply to Office Action

*REMARKS/ARGUMENTS**The Pending Claims*

The pending claims are directed to a method of chemically-mechanically polishing a substrate. Claims 1-3, 6-10, 13-19, 21, and 32-39 are currently pending. Reconsideration of the pending claims is respectfully requested.

*Discussion of the Claim Amendments*

Claim 20 has been canceled as it was a duplicate of pending claim 7. Claims 1, 7, 36, 38, and 39 have been amended to delete hydroxylamine from the group of reducing agents recited therein. No new matter has been added by way of these amendments.

*Summary of the Office Action*

The Office Action rejects claims 1-3, 6-9, 13, 14, 16-18, 20, 21, 32-34, and 36-39 under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent Application Publication 2002/0182982 A1 (Li et al.) (hereinafter "the Li '982 publication") in view of U.S. Patent Application Publication 2002/0086511 A1 (Hartner et al.) (hereinafter "the Hartner '511 publication"). The Office Action also rejects claims 10, 15, and 19 as allegedly unpatentable over the Li '982 publication in view of the Hartner '511 publication and further in view of U.S. Patent 6,454,822 (Rosenflanz) (hereinafter "the Rosenflanz '822 patent"). The Office Action further asserts that claim 35 is allegedly unpatentable over the Li '982 publication in view of the Hartner '511 publication and further in view of U.S. Patent 5,783,489 (Kaufman et al.) (hereinafter "the Kaufman '489 patent").

*Discussion of Office Action*

The reflected claims are directed to a method of polishing a substrate comprising a noble metal oxide by use of a chemical-mechanical polishing system comprising a polishing compound (i.e., an abrasive, a polishing pad, or both), a particular reducing agent, and a liquid carrier.

The Office Action asserts that the Li '982 publication discloses a method of polishing a metal in an oxidized form, comprising contacting a portion of the metal with a polishing pad and a slurry comprising abrasive particles and a reducing agent (e.g., hydroxylamine). The Office Action acknowledges that the Li '982 publication fails to disclose that the metal in oxidized form may be a noble metal selected from a specified group, but asserts that such a

Application No. 10/753,138

Supplemental Reply to Office Action

method would be obvious in view of the Hartner '511 publication. The Hartner '511 publication is generally directed to a method for fabricating a patterned layer from a layer material, which method comprises (a) providing a substrate with at least one target region and at least one migration region, (b) applying a layer material, (c) adding a material selected from a recited group, and (d) performing a heat treatment such that the layer material migrates from the migration region to the target region.

As is well-settled, in order to establish a *prima facie* case of obviousness with respect to a claim, at least three basic criteria must be met: (1) the combined references must teach or suggest all of the claim limitations, (2) there must be some suggestion or motivation, either in the references or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings, and (3) the prior art references must provide one of ordinary skill in the art with a reasonable expectation of success in so making the subject matter defined by the claims in issue. See, e.g., M.P.E.P. § 2142.

The Office Action, however, fails to demonstrate that (a) the combination of the Li '982 publication and the Hartner '511 publication teaches or suggests all the claim limitations recited in the pending claims, (b) there is a suggestion or motivation to modify the combination of the Li '982 publication and the Hartner '511 publication to arrive at the invention defined by the pending claims, and (c) one of ordinary skill in the art would have had a reasonable expectation of success in modifying the references.

The Li '982 publication is generally directed to a polishing method and composition for planarization of a substrate surface with reduced or minimal residual conductive material remaining from a polishing process (see the Li '982 publication at paragraph 0041). The residual conductive materials may include copper-containing materials such as copper, copper alloys, and doped copper as well as by-products of copper-containing materials, such as copper oxides (the Li '982 publication at paragraph 0041). The Li '982 publication further provides that the compositions and processes disclosed therein can additionally polish metal layers including layers comprising aluminum, doped aluminum, nickel, doped nickel, tantalum, tantalum nitride, tungsten, tungsten nitride, titanium, titanium nitride, and combinations thereof (paragraphs 41 and 63). The Li '982 publication provides that a reducing agent selected from the group of hydroxylamine, glucose, sulfathionate, potassium iodide, and combinations thereof may be added to the polishing composition to enhance removal of material from the substrate surface (paragraph 62).

Application No. 10/753,138

Supplemental Reply to Office Action

However, nothing within the Li '982 publication discloses or suggests that a polishing composition comprising a reducing agent selected from the group consisting of 3-hydroxy-4-pyrones,  $\alpha$ -hydroxy- $\gamma$ -butyrolactones, borane, borohydrides, dialkylamine boranes, formaldehyde, formic acid, hydrogen, hydroquinones, hypophosphorous acid, trihydroxybenzenes, solvated electrons, sulfurous acid, salts thereof, and mixtures thereof, can be used to polish or planarize any substrate surface, let alone a substrate surface comprising a noble metal in an oxidized form as recited in the pending claims. Further, nothing within the Li '982 publication discloses or suggests that the polishing compositions and processes disclosed therein can be used to planarize a substrate surface comprising a metal in an oxidized form, wherein the metal is a noble metal comprising platinum, iridium, ruthenium, rhodium, palladium, silver, osmium, gold, and combinations thereof, as recited in the pending claims.

The Hartner '511 publication fails to cure the deficiencies of the Li '982 publication. The Hartner '511 publication teaches that the method recited therein can comprise a chemical-mechanical planarization (CMP) step on a substrate comprising iridium oxide, but the Hartner '511 publication is silent as to the details of the CMP step. Thus, the Li '982 publication and the Hartner '511 publication, taken separately or together, fail to disclose or suggest all of the elements of the claimed invention.

In addition, both the teaching or suggestion to make the claimed combination and the reasonable expectation of success must be based on the information recited in the cited references, as opposed to an applicant's disclosure. Indeed, absent a reasonable teaching or suggestion to make the claimed combination, a reasonable expectation of success cannot exist. Yet, neither the Li '982 publication nor the Hartner '511 publication provides the necessary teaching or suggestion (i.e., the motivation) to one of ordinary skill in the art to combine their respective disclosures in the manner necessary to arrive at the present invention as defined by the pending claims.

For the foregoing reasons, the Office Action has failed to establish a proper *prima facie* case of obviousness for claims 1-3, 6-10, 13-19, 21, and 32-39. The Office Action has not (a) demonstrated that the disclosures of the cited references teach or suggest all the claim limitations, (b) identified a clear and particular suggestion or motivation in the prior art to combine and/or modify the disclosures of the cited references (in the absence of hindsight knowledge of the present invention), nor (c) established that one of ordinary skill in the art

Application No. 10/753,138

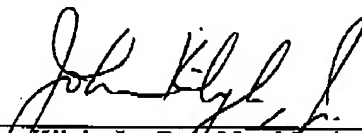
Supplemental Reply to Office Action

would have a reasonable expectation of success upon the combination or modification of the disclosures of the cited references.

*Conclusion*

The obviousness rejections are improper and should be withdrawn for the reasons discussed herein. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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